

REMARKS

The Examiner objected to Fig. 4 as disclosing “only that which is old.” Applicants have designated Figs. 4 and 5 as prior art and replacement sheets are submitted herewith. Applicants request the objection be withdrawn.

Claims 1-8 and 11-18 stand rejected under 35 U.S.C. 103(a) over Myers in view of Wennemuth. Claims 1 and 11 have been amended to describe that the first and second groups of contact regions are included within a single layer and that the first and second groups are disposed between the package and the substrate. Applicants respectfully submit that neither Myers nor Wennemuth, alone or in combination, teach the claimed invention.

The application describes a simple and cost effective method for connecting an integrated circuit to a substrate and a corresponding circuit arrangement which remains largely uninfluenced by thermal mismatch but nevertheless has good heat dissipation properties. The circuit arrangement taught in the application comprises two groups of contact regions which are both arranged in the same layer. The first group of contacts is arranged in a near region surrounding a point on the connection side, the second group of contacts is arranged outside in a far region surrounding the near region. The first group of contacts forms a rigid connection and the second group of contacts forms an elastic connection.

Independent claims 1 and 11 recite a “first group of contact regions and a second group of contact regions” and further describe that “the first group of contact regions form a rigid connection and the second group of contact regions form an elastic connection between the package and the substrate.” Claims 1 and 11 have been amended to further describe that “the first and second groups of contact regions are included within a single layer” and that “the first and second groups are disposed between the package and the substrate.” The arrangement of the contact regions in the same layer while disposed between the package and the substrate is shown in Figs. 1A, 1B, 2 and 3.

The references cited by the Examiner fail to show these claimed features. On page 3 of the Action, the Examiner stated that “Myers point out that one of the two groups of contacts have the important function of providing rigid support (Col. 7 lines 34-42) to the structure, but fails to mention explicitly the function of flexibility of the other contract group.” Applicants respectfully submit that the Examiner has mischaracterized the reference. The cited portion of Myers at col. 7, lines 34-42 states only that

In addition, the method of this invention enables the height of the solder bumps 16 to be closely controlled in order to achieve proper spacing between the flip chip 12 and the circuit board. In so doing, a sufficient gap between the flip chip 12 and the substrate 10 is achieved to enable flux residue cleaning, stress relief of the solder bumps 16 during thermal cycle, and flow of a mechanical bonding and encapsulation material between the flip chip 12 and the substrate 10.

Applicants submit that Myers does not teach that one group of contacts provides “rigid support.” Applicants further submit that Myers also does not teach that providing rigid support is an “important function.” Myers is directed to methods for controlling the height of solder bumps. Myers teaches the use of two types of bumps, solder bumps that are electrically active and dummy bumps that are electrically inactive. There is no teaching anywhere in Myers that either of these groups of bumps is either rigid or elastic or that one may be rigid while the other is not. Even if the solder bumps taught by Myers are inherently rigid, there is no suggestion anywhere in Myers of any elastic connection between the package and the substrate. Thus, it is not surprising that Myers “fails to mention explicitly the function of flexibility of the other contract group” because flexibility is irrelevant to the teachings of Myers.

Because there is not even a hint of the claimed “elastic connection between the package and the substrate” in Myers, the Examiner resorted to Wennemuth to show this claimed feature. Wennemuth teaches stacking a series of electronic elements by disposing them on elastic isolating bodies. Applicants note that Wennemuth teaches at para. 93 that the isolating body can be “an

isolating film 14, an isolating plate such as a plastic carrier 10, or an isolating layer, although a limited flexibility must exist for bending the isolating body 7.”

Applicants submit that the plastic isolating body of Wennemuth does not resemble any structure claimed or described in the application. The isolating body of the reference appears to be a rectangular structure on which an entire chip, including its contact regions, can be placed. Thus, the only flexibility taught by Wennemuth is in the isolating body which is placed between layers in a stack of electronic elements. The isolating body of Wennemuth does not teach that the first and second groups of contact regions are contained within the same layer and that the first and second groups are disposed between the same package and substrate. The isolating body of Wennemuth is never included within the same layer as a first group of contact regions and is never disposed between the same package and substrate as a first group of contact regions.

For these reasons, Applicants respectfully submit that the references cited by the Examiner fail to teach the claimed invention.

Claims 9, 10, 19 and 20 stand rejected under 35 USC 103(a) over Myers in view of Wennemuth and in further view of Smith. Applicants respectfully traverse this rejection.

Claims 9 and 10 depend from allowable claim 1. Smith does not disclose the features of claim 1 as detailed above with respect Myers and Wennemuth, nor has the Examiner has cited Smith as disclosing such features. Therefore, claims 9 and 10 are allowable for at least the reasons detailed above.

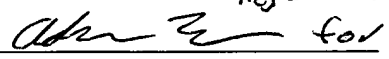
Claim 20 has been amended to correct a typographical error and now correctly depends from claim 11 rather than claim 1. Accordingly, claims 19 and 20 depend from allowable claim 11. Smith does not disclose the features of claim 11 as detailed above with respect Myers and Wennemuth, nor has the Examiner has cited Smith as disclosing such features. Therefore, claims 9 and 10 are allowable for at least the reasons detailed above.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 543822003800.

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